membered aryl, unsubstituted or halogenated 5-8 membered heteroaryl, unsubstituted or halogenated 4-8 membered saturated heterocycle or carbocycle; wherein each of the above heteroaryl groups independently contains 1-3 heteroatoms selected from the group consisting of N, O and S.

[0014] In the present application, Boc is tert-butoxycarbonyl, TBS is tert-butyldimethylsilyl, and TES is triethylsilyl.

[0015] In another preferred embodiment, R_3 is OH, OBoc, $OCH_2OP(=O)(OH)_2$, $—OCH_2OP(=O)(OBn)_2$, OTBS, OTES, OCH_2SCH_3, or OCH_2OCH_3. In another preferred embodiment, R_3 is OH. In another preferred embodiment, R_3 is β-OH. In another preferred embodiment. R_3 is OBoc, $OCH_2OP(=O)(OH)$ or $—OCH_2OP(=O)(OBn)_2$.

[0016] In another preferred embodiment, at most one X is OH.

[0017] In another preferred embodiment, the configuration of the 14-position carbon is an α-configuration or a β-configuration.

[0018] In another preferred embodiment, each X is H.

[0019] In another preferred embodiment, Y is O.

[0020] In another preferred embodiment, R_1 is a substituted or unsubstituted following group: C1-C4 alkyl, C3-C6 cycloalkyl, C6-C10 aryl or 4-8 membered heteroaryl, wherein the term "substituted" means one or more hydrogen atoms on the group are substituted with a substituent selected from the group consisting of halogen, —OH, unsubstituted or halogenated C1-C4 alkyl, and unsubstituted or halogenated C1-C3 alkoxy.

[0021] In another preferred embodiment, R_1 is cyclohexyl, n-propyl, n-butyl, phenyl, 2-furyl, p-methylphenyl, p-methoxyphenyl, or p-trifluoromethylphenyl.

[0022] In another preferred embodiment, R_2 is a substituted or unsubstituted group selected from the group consisting of: C1-C4 alkyl, C7-C10 arylalkyl, 4-6 membered heteroaryl or $—C(=O)R_4$, wherein R_4 is a substituted or unsubstituted group selected from the group consisting of: C1-C4 alkyl, C3-C6 cycloalkyl, C6-C10 aryl, C7-C15 arylalkyl or 4-8 membered heteroaryl, wherein the term "substituted" means one or more hydrogen atoms on the group are substituted with a substituent selected from the group consisting of halogen, —OH, unsubstituted or halogenated C1-C4 alkyl, and unsubstituted or halogenated C1-C3 alkoxy.

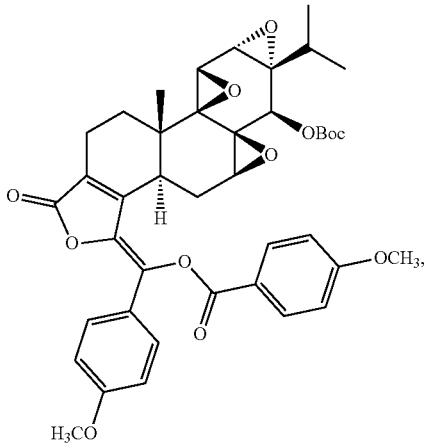
[0023] In another preferred embodiment, R_2 is C1-C4 alkyl, C7-C10 arylalkyl or $(CO)R_4$. In another preferred embodiment, R_2 is methyl, ethyl, propyl or butyl. In another preferred embodiment, R_4 is a substituted or unsubstituted following group: C1-C4 alkyl, C3-C6 cycloalkyl, C6-C10 aryl and 4-8 membered heteroaryl.

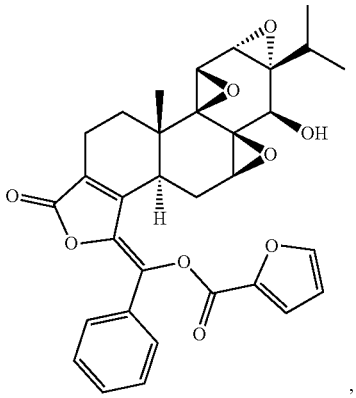
[0024] In another preferred embodiment, R_4 is cyclohexyl, n-butyl, n-propyl, phenyl, 2-furyl, p-methylphenyl, p-trifluoromethylphenyl, or p-methoxyphenyl.

[0025] In another preferred embodiment, R_1 and R_2 are the same or different.

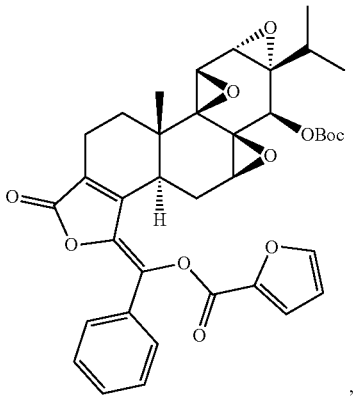
[0026] In another preferred embodiment, R_1 and R_4 are the same or different.

[0027] In another preferred embodiment, the compound is:

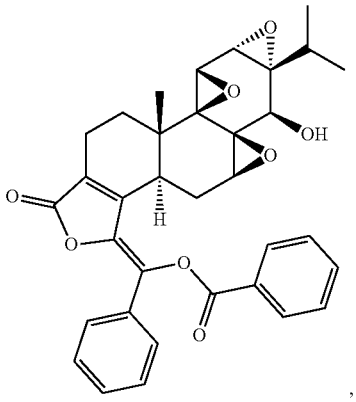




,



,



,